

PATENT SPECIFICATION (11)

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(54) A VENETIAN BLIND

(71) We, GRIESSER AG, a Swiss Body Corporate of CH-8355 Aadorf, Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to the construction of venetian blinds and, in particular, to a new and useful venetian blind which is equipped with pull members for raising and lowering the blind, which extend in lateral casings, act on a bottom bar or the bottom slat of the blind, and are coupled to a drive shaft.

Venetian blinds of this kind are known which are frequently equipped with endless chains or bands which are passed over an upper wheel receiving its motion from a drive shaft, and around a lower, idle return pulley. Bands are relatively inexpensive, but they cannot ensure either a reliable engagement with the drive shaft or a locking of the blind against undesirable pushing-up of the same. Endless chains do prevent the last-named disadvantage, but due to their length and the necessity of providing a lower return pulley, they are relatively expensive.

The present invention is directed to a venetian blind which is equipped with pull members making possible a relatively inexpensive and simple construction and, in addition, permits securing the blind in its lowered position, or any intermediate position, against undesirable pushing-up, without necessitating additional locks or the like.

To this end, the invention consists in a venetian blind in which the means for raising and lowering the blind comprises a housing, a sprocket wheel rotatably mounted in said housing, a sprocket chain having one end connected to the lowermost slat or bar of the blind and being engaged over said sprocket wheel to be movable by said sprocket wheel to raise and lower the blind, said housing having first and second chain guide passage portions leading toward and away from said sprocket wheel and a portion around said sprocket wheel which guide the chain for movement in a confined path and prevent the chain from buckling.

In consequence, the chain, which is conveniently connected to the bottom bar by means of a connecting arm guided in the first guide passage portion, cannot buckle at any point along its path of motion by more than the small amount permitted by the confined guide path and thus behaves approximately as a rigid member between the bottom bar and the sprocket wheel in any position so that a completely or partly lowered blind cannot be pushed up by a force acting on the bottom bar since the sprocket wheel drive shaft itself cannot be rotated by the chain.

Because of the small play of the chain in the guide passage, a reduction in its length due to a small zig-zag buckling of the chain upon an attempt to push the blind up is possible and although small is still noticeable. The chain links may also get jammed in the groove, whereby, even though this counteracts the pushing up, it makes the lowering of the blind difficult on some occasions. This problem is satisfactorily solved by designing the chain in a manner such that it can bend from a straight form only in the direction in which it curves around the sprocket wheel and not in the opposite direction. Any zig-zag buckling of the chain in the guide groove and jamming of the individual chain links is thereby prevented. Advantageously, the edges of the chain links which, when the chain is in the first passage portion, face the vertical plane passing through the axis of the sprocket wheel, is curved in a usual manner so that, in this direction, i.e., in the direction in which the chain is deflected around the sprocket wheel, the chain can deflect or bend, while the other, outer, edges of the chain links following each other with a small play, are straight, so that these edges extend parallel to each other and prevent buckling or deflection of the chain from its stretched position in the opposite, outward direction. For this reason, the stretched, vertical chain length behaves as a rigid bar preventing the blind from being pushed up.

For a better understanding of the invention and its advantages, reference will now be made to the accompanying drawings.

In the Drawings:—

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Fig. 1 is a schematic elevational view of a lowered blind, constructed in accordance with one embodiment of the invention;

Fig. 2 is an enlarged vertical sectional view of one of the guide casings for the blind of Fig. 1;

Fig. 3 is a sectional view taken along line III—III of Fig. 2;

Fig. 4 is a sectional view taken along the line IV—IV of Fig. 2;

Fig. 5 is a vertical sectional view of one of the lateral guide casings of another embodiment of the invention, with the blind lowered; and

Fig. 6 is a partial sectional view taken along the line A—A of Fig. 5.

Referring to the drawings, the embodiment of Figs. 1 to 4 shows a venetian blind construction, generally designated 50, which includes a plurality of slats 1 which are interconnected by supporting elements 2 and which are raised and lowered by a pull member or chain 9 which is moved, by a rotatable sprocket wheel 7, in a housing or casing 6 having means for guiding the chain into association with the sprocket, over the sprocket and away from the sprocket, without the chain coming out of a confined path of movement.

The slats 1 are suspended from the structure of a drive shaft 3. Drive shaft 3 is rotatable through a transmission 4 by means of a crank handle 5. A motor drive could also be used, of course. The casings 6 at each side of the blind are each closed at their tops by a hood 6a enclosing the sprocket wheel 7 carried by the shaft 3. Connecting arms 8 secured to opposite ends of the bottom bar 1a of the blind respectively project into the associated casing 6 and connect with one end of a chain 9 which extends upwardly in casing 6 and is passed over its associated sprocket wheel 7. With the blind lowered, the other end of the chain 9 is in a position extending beyond its sprocket wheel (Fig. 2).

As shown in Figs. 2, 3 and 4, casing 6 has an approximately inverted U-shaped cross-section and comprises two guide grooves or passages 11a, 11b, separated by a central vertical slot 10, in which the respective chain end portions are guided with a small lateral play. The connecting arm 8 of bottom bar 1a projects through slot 10 (see Fig. 4) into casing 6 and is bent at right angles towards passage 11a in which it is guided by means of rollers 8a. Fig. 4 shows that slot 10 of casing 6 is undercut, and that cross-pins 12 are guided in the enlarged space 10a thus formed. The pins 12 are provided on each, or every other, slat 1. This makes a blind for exterior use which is wind-resistant. In order to make possible the introduction of cross-pins 12 into narrow slot 10 of casing 6, passage 11b for the free chain end is designed as a separate part 6b of casing 6 and is in the form of a

channel section which is snapped onto retaining projections 6c provided on casing backwall 30. The hood part 6a is aligned with respective passages 11a, 11b and also defines a guide channel 11c around the sprocket wheel 7 allowing for only a small radial play of chain 9, so that along the entire path of motion of chain 9, buckling of the chain or lifting from sprocket wheel 7 is prevented. This ensures that bottom bar 1a and, thereby, the blind, cannot be pushed upwardly from its partly or completely lowered position, since the chain portion between arm 8 and sprocket wheel 7 behaves as a rigid bar, while drive shaft 3 carrying sprocket wheel 7, due to the transmission coupled thereto, is self-locking and blocks any rotation of the sprocket wheel by longitudinal pressure on the chain. On the other hand, the blind can be gathered any time by rotating drive shaft 3, thus moving chain 9 by sprocket wheel 7.

In the embodiment according to Figs. 5 and 6, guide casings 16 are provided at each side of a blind (not shown), which are each closed at their tops by a corresponding guide hood portion 16a of the casing which encloses a sprocket wheel 17 affixed to drive shaft 13 of the blind. Connecting arms 18 are secured to the bottom bar 1a' of the blind, each projecting into its associated casing 16 and being connected to one end of a chain 19 which extends upwardly in casing 16 over sprocket wheel 17. With the blind lowered, the other free end portion (link 19b) of the chain extends beyond its sprocket wheel 17 (Fig. 5). Casing 16 has an approximately U-shape cross-section and comprises two guide passages 21a and 21b, which are disposed on respective sides of a central vertical slot and in which the respective ends of chain 19 are guided with small lateral play. In contradistinction to the first embodiment of the invention, the chain 19 is assembled of chain links 19a which are of asymmetrical shape relative to the plane which, with the chain stretched, passes through the axes of the hinge pins 20 interconnecting the joint plates 19b and the chain links 19a. While the outer edges 22 of chain links 19a are flat and parallel to the said plane and the portions 23 of the link ends which are adjacent and perpendicular thereto are also flat, the inner edges of the chain links to the other side of said plane are concave and the adjacent portions 24 of the link ends are beveled. The end portions 23 which are parallel to and oppose each other with a small play, prevent any buckling of the chain toward the outside (toward the lefthand side of Fig. 5), while the flat outside surfaces 22 of the chain links provide a sliding guidance for the chains within passages 21a and 21b.

On the other hand, the beveled end portions 24 of the chain links permit easy bending of the chain around the sprocket

wheel 17. Further, hood 16a is provided with a central rib 25 intended for holding down the chain, by which, in cooperation with hinge pins 20 of the chain, any lifting of chain 19 from sprocket wheel 17 is prevented.

Due to the described design of the chain and its guidance, no buckling or jamming of the chain in passages 21a and 21b is possible. In combination with rib 25 and the self-locking drive of shaft 13, it is also ensured that the blind can never be unintentionally pushed up.

The construction of the actuating mechanism of the venetian blind of this invention is simple, resistant to disturbances, omits expensive locking means, and is secure against undesired manipulation from the bottom bar, whatever its position.

While specific embodiments of the invention have been shown and described in detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from the scope of the appended claims.

WHAT WE CLAIM IS:—

1. A venetian blind in which the means for raising and lowering the blind comprises a housing, a sprocket wheel rotatably mounted in said housing, a sprocket chain having one end connected to the lowermost slat or bar of the blind and being engaged over said sprocket wheel to be movable by said sprocket wheel to raise and lower the blind, said housing having first and second chain guide passage portions leading toward and away from said sprocket wheel and a portion around said sprocket wheel which guide the chain for movement in a confined path and prevent the chain from buckling.

2. A venetian blind, according to claim 1, wherein said first and second passage portions are separated by a vertical slot and a connecting arm secured to said lowermost slat or bar extends through said slot and is connected to the end of the chain in said first passage portion, and wherein said housing portion around said sprocket wheel comprises a hood which extends between said first and second passage portions, said chain being of a length such that at least one link at the end thereof opposite to said arm extends beyond said sprocket wheel into said second passage portion when the blind is in its lowermost position.

3. A venetian blind according to claim 2, wherein said second passage portion comprises a portion having a channel shaped cross-section, said housing has a wall portion spanning the vertical slot between said first and second passage portions, and snap-connection means is provided between said wall and said channel-shaped portion of said

second passage portion.

4. A venetian blind according to claim 1, wherein said first passage portion and said second passage portion are arranged in spaced, substantially parallel positions on opposite sides of said sprocket wheel, and including an arm connected to the end of said chain in said first passage and having rollers thereon for guiding it along said first passage, said arm also being connected to the lowermost slat or bar of the blind.

5. A venetian blind according to claim 1, including an arm member connected to the end of said chain in said first passage portion and having a portion extending out of said first passage portion toward said second passage portion and then at right angles between said passage portions out of said housing so as to terminate in an end which is connected to said lowermost slat or bar, and a cross-pin carried on said right angle portion of said arm, said housing having an undercut portion extending between said passage portions and enclosing said cross-pin against removal from said undercut portion.

6. A venetian blind according to any preceding claim, wherein said chain includes a plurality of links having connecting members between said links which have one flat edge engageable on the adjacent wall of said first passage portion and an opposite concave edge, the end portions of said connecting members adjacent said one edge being squared and closely abutting the corresponding end portions of adjacent connecting members to prevent buckling of the chain in one direction, the end portions of the connecting member adjacent the concave edge being beveled to permit the chain to bend around the sprocket wheel.

7. A venetian blind according to any preceding claim, wherein said housing portion around said sprocket wheel has a rib extending downwardly thereinto over said sprocket wheel and forming a guide engaging between spaced apart portions of the chain links.

8. A venetian blind substantially as hereinbefore described with reference to the accompanying drawings.

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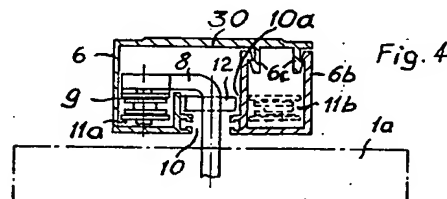
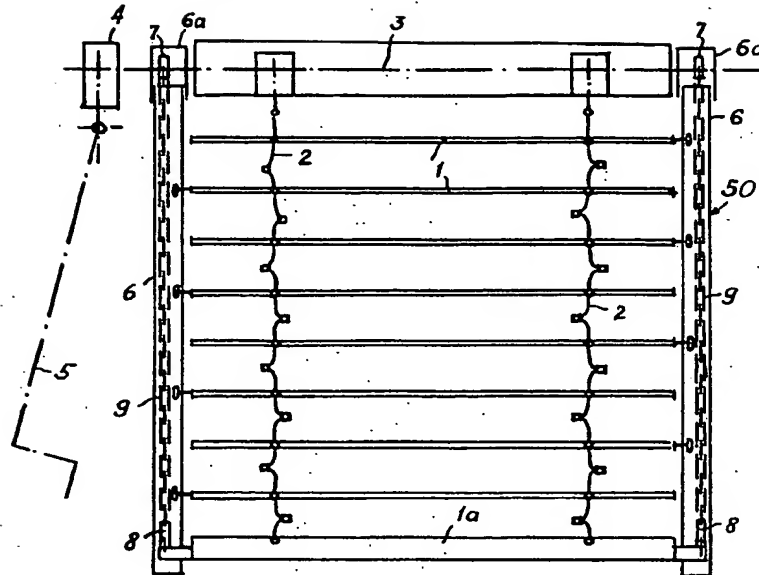
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COMPLETE SPECIFICATION

3 SHEETS

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the Original on a reduced scale
Sheet 1

Fig. 1

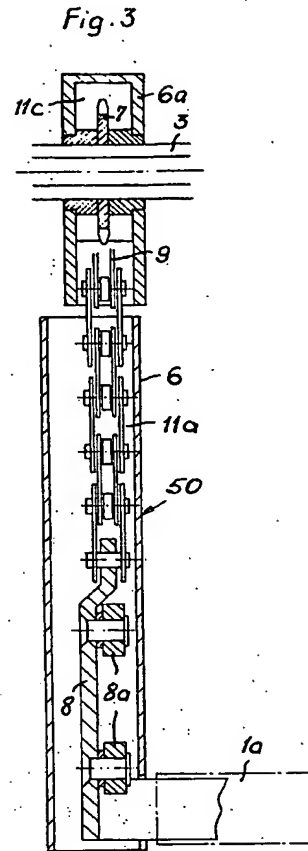
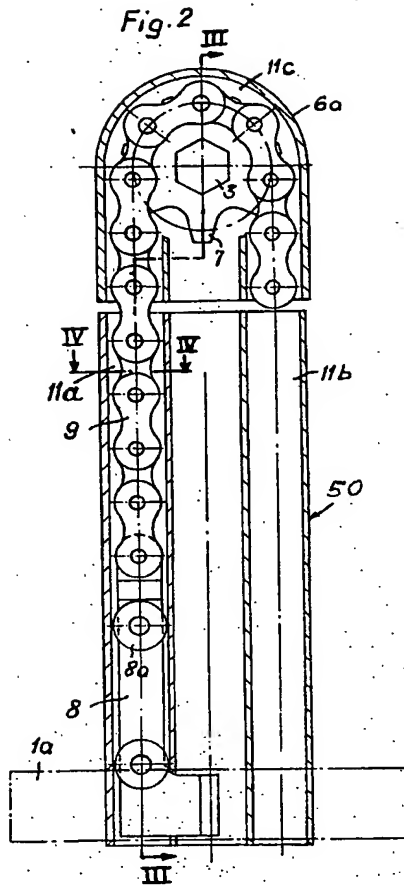


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COMPLETE SPECIFICATION

3 SHEETS

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Sheet 2



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COMPLETE SPECIFICATION

3 SHEETS

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Sheet 3

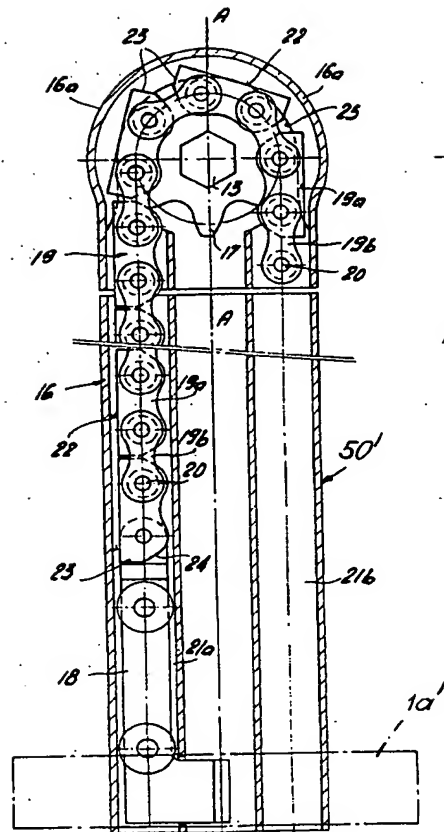


Fig. 5

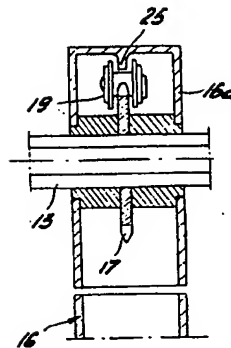


Fig. 6